NEW ZEALAND JOURNAL OF SCIENCE

VOLUME 20 1977

Editor: J. G. Gregory
Assistant Editor: N. Hawcroft

Crown Copyright © 1977

The quarterly journal
N.Z. Journal of Science
(Volume 1, 1958)

superseded in part

N.Z. Journal of Science and Technology: Section B—General
(Volume 20, 1938—Volume 38, 1957)

and

N.Z. Journal of Science and Technology
(Volume 1, 1918—Volume 19, 1938)

CONTENTS

Volume 20, 1977

Number 1

Page

Errata 2

WALKER, I. K.Changes of bound water in wood. 1. Non-Fickian changes of weight at 25°C .. 3

MCNABB, A.; HEATH, J. M. Approximate equations for the diffusion of heat and moisture in wool 11

GRANT, M. A. Approximate calculation based on the simple one-phase model of a geothermal field 19

ROBINSON, J. L. An estimate of the lifetime of the Wairakei geothermal field 27

LODGE, N. Physical and chemical properties of New Zealand citrus peel oils 31

SHORLAND, F. B.; MASON, C. G. W. Evaluation of insecticidal smokes against the cockroach (*Periplaneta americana*) 33

LAFFAN, M. D.; CUTLER, E. J. B. Landscapes, soils and erosion of a small catchment in the Wither Hills, Marlborough. 1. Landscape periodicity, slope deposits and soil pattern .. 37

PULLAR, W. A.; RIJKSE, W. C. Estimation of recent alluvial infilling of Tolaga Bay Flats basin, using Waimihia Formation and Taupo pumice as tephra marker beds 49

GIBBS, M. M. Study of a septic tank system on a lake shore: Temperature and effluent flow patterns 55

TRENBERTH, K. E. Relationships between inflow to Clutha lakes, broad-scale atmospheric circulation parameters, and rainfall 63

BATESON, F. M. The light curve of the dwarf nova, VW Hydri 73

Number 2

LEACH, B. F. New perspectives on dating obsidian artefacts in New Zealand 123

BOYD, N. S.; WILSON, N. D. C. Hypoxanthine concentrations as an indication of freshness of iced snapper 139

WHITE, M. S. Thermochemistry of the superphosphate reaction 145

SPEIR, T. W. Studies on a climosequence of soils in tussock grasslands.
10. Distribution of urease, phosphatae, and sulphatase activities in soil fractions .. 151
11. Urease, phosphatase, and sulphatase activities of topsoils and their relationships with other properties including plant available sulphur 159

MOLLOY, L. F.; SPEIR, T. W. Studies on a climosequence of soils in tussock grasslands.
12. Constituents of the soil light fraction 167

ROSS, D. J. Protease activity, and its relationship to nitrogen mineralisation, in some soils under pasture and tussock grassland 179

Page

GLASBY, G. P. Why manganese nodules remain at the sediment-water interface 187

WALKER, I. K.; HARRISON, W. J. Self-heating of wet wood.
1. Exothermic oxidation of wet sawdust 191

WALKER, I. K.; TILBURY, A. L. Diffusion of regain in bulk wool.
10. The fast negative regain wave 201

WALKER, I. K.; READ, A. J.; HARRISON, W. J. Calorimetry of oxidation reactions.
2. Measurement of a diminishing reaction rate 211

CLEAR, M. H.; FOWLER, F. R.; SOLLY, S. R. B.; RITCHIE, A. R. Detection of organophosphorus and carbamate pesticides in adipose tissue by thin-layer and gas-liquid chromatography 221

RITCHIE, A. R.; CLEAR, M. H.; SOLLY, S. R. B. Improved gas-liquid chromatographic method for determining nitrofuran drug residues in animal tissues 225

ROSS, C. W.; MEW, G.; SEARLE, P. L. Soil sequences on two terrace systems in the north Westland area, New Zealand 231

Number 3

WALKER, I. K.; JACKSON, Fay H. The heat balance in spontaneous ignition 245

GIBBS, M. M. Soil renovation of effluent from a septic tank on a lake shore 255

ELKIS, W. J. A hot-water cylinder to resist earthquakes 265

SOONG, R.; GLUSKOTER, H. J. Mineral matter in some New Zealand coals.
1. Low-temperature ashing and mineralogical composition of such coal ashes 273

LAFFAN, M. D.; CUTLER, E. J. B. Landscapes, soils and erosion of a catchment in the Wither Hills, Marlborough.
2. Mechanism of tunnel-gully erosion in Wither Hill soils from loessial drift and comparison with other loessial soils in the South Island 279

DANDY, A. J. Production and characterisation of activated carbons from agricultural waste products and wood charcoals 291

SMIDT, R. E.; COX, J. E.; FURKERT, R. J.; WELLS, N. Mineralogy of topsoils of Ngunguru Basin, Northland, New Zealand 297

BIRRELL, K. S.; PULLAR, W. A.; SEARLE, P. L. Weathering of Rotoehu Ash in the Bay of Plenty district 303

WARD, N. I.; ROBERTS, E.; BROOKS, R. R. Lead uptake by seedlings of *Lolium perenne* L. and *Trifolium repens* L. 311

WELLS, N.; WHITTON, J. S. A Pedochemical Survey.
3. Boron 317

SUTTON, F. M.; MCNABB, A. Boiling curves at Broadlands geothermal field, New Zealand.. 333

TRENBERTH, K. E. Surface atmospheric tides in New Zealand 339

WATSON, D. B.; CHIN, S. C. Breakdown of solid dielectrics by treeing 357

Number 4

	Page
RIJKSE, W. C. Application of multispectral aerial photographs to soil surveys in New Zealand	363
METSON, A. J.; GIBSON, E. Janice; COX, J. E.; GIBBS, D. B. The problem of acid sulphate soils, with examples from North Auckland, New Zealand	371
DAY, J. Philip. Lead pollution in Christchurch	395
WARD, N. J.; ROBERTS, E.; BROOKS, R. R. Lead pollution from a New Zealand battery factory and smelter compared with that from motor-vehicle exhaust emissions	407
WARD, N. I.; BROOKS, R. R.; ROBERTS, E. Contamination of pasture by a New Zealand base-metal mine	413
MATTHEWS, K. M. Natural outdoor radiation exposure in New Zealand	421
BALTAKMENS, T.; GREGORÝ, L. P. Profiles of ^{90}Sr and ^{137}Cs concentrations in selected New Zealand soils and their bearings on milk contamination levels	425
CHILDS, C. W.; SEARLE, P. L.; WELLS, N. Infiltration through soil as a tertiary treatment of sewage effluent	433
BAKER, R. T. Humic acid-associated organic phosphate	439
MOLLOY, L. F.; BRIDGER, Barbara A.; CAIRNS, Annette. Studies on a climosequence of soils in tussock grasslands. 13. Structural carbohydrates in tussock leaves, roots, and litter and in the soil light and heavy fractions	443
ROSS, D. J.; MOLLOY, L. F. Studies on a climosequence of soils in tussock grasslands. 14. Water-soluble carbohydrates in tussock plant materials and in a light fraction from soil	453
LODGE, N.; WILKINSON, S. A. Additional information on the physical and chemical properties of New Zealand lemon peel oil	461
MEREDITH, Peter. Amylase activities in frosted wheat	465
Author index	469
Subject index	471